Interpositional Flap Reconstruction of Temporomandibular Joint Using a Novel Anterior-Based Mastoid Flap Technique

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Abstract In this report, it was aimed to use the anterior-based mastoid fascia flap as an interpositional graft in TMJ surgery. This technical report, along with this characteristic, is the first in the literature.

Keywords Temporomandibular joint · Mastoid fascia flap · Ankylosis · Interposition arthroplasty

Introduction

After surgery, the temporomandibular joint can be reconstructed using various interpositional grafts, of which the temporalis muscle fascia graft has become popular [1]. Nonetheless, some functional problems can occur due to the formation of a scar in the temporal muscle [2]. The mastoid fascia is an independent anatomic structure that is also used in the reconstruction of different facial areas [3, 4]. This technical report presents a novel mastoid fascia flap (MFF) as an interpositional graft in temporomandibular joint surgery.

Surgical Technique

The mastoid fascia is an extension of the superficial temporal fascia, which leaves the temporal muscle with the innominate fascia and extends to the mastoid process over

the auricular sulcus and forms the mastoid fascia. The mastoid fascia consists of two laminae. The posterior auricular artery mainly feeds the superficial lamina, while the posterior branch of the superficial temporal artery, and the posterior auricular, superior auricular, and occipital arteries feed both laminae.

The nerve supply of the MFF originates from the lesser occipital nerve, which is one of the four cutaneous branches of the cervical plexus that arises between the second and third cervical vertebrae. The lesser occipital nerve innervates the superior ear and mastoid region dominantly [4].

With its bountiful arterial supply, the mastoid fascia can be used in anteriorly, posteriorly, and superiorly based flaps. The nourishing artery of the anteriorly based flap is the posterior branch of the superficial temporal artery. To dissect the flap, the classical preauricular incision is extended from the auricular sulcus superiorly towards the mastoid process. The cutaneous and subcutaneous fasciae are incised to reach the mastoid fascia (Fig. 1). The subcutaneous fascia is dissected over the mastoid fascia to enable the desired elevation of the mastoid fascia (Figs. 2, 3). Protecting the periosteum from slightly posterior to the auricular sulcus up to the anterior part and then the zygomatic arch, the deep and superficial laminae are dissected without being separated. To elevate the mastoid fascia over the zygomatic arch, some of the temporal muscle fascia is also incised. The elevated fascia is transposed into the joint cavity over the zygomatic arch and then sutured to the peripheral soft tissues.

Although an incision in the auricular sulcus for exploring the mastoid fascia is advantageous cosmetically because it is hidden behind the ear, this incision may cause postoperative discomfort because it is still twice as long as the classical preauricular incision. The advantages of the

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Fig. 1 Exposure of the mastoid fascia

Fig. 2 Harvesting of anterior-based mastoid flap

anterior-based MFF are its bountiful nourishment and low incidence of facial nerve injury because there is no need to dissect the transition zones of the facial nerve branches. The flap is raised quickly, it adds little bulk over the zygomatic arch, and the donor site scar is minimal, with no temporal hollowing compared with the temporalis myofascial flap.

Considering the above-mentioned characteristics, we are of the opinion that the anterior-based MMF, as an

Fig. 3 Anatomical illustration of mastoid flap. Temporalis muscle (TM), mastoid flap (MF), mastoid process (MP), external auditory canal (EAC)

interpositional graft, can be an alternative to other techniques, particularly in discectomy and osteoarthrectomy. Nevertheless, there is the need to conduct long-term case follow-up studies so as to be able to fully evaluate the success of the flap.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no competing interests.

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